CLAIMS

What is claimed is:

1. A method of forming high aspect ratio copper structures, comprising;

depositing a photoresist;

performing a reactive ion etch (RIE) process to form a trench;

depositing Cu;

performing single chemical mechanical polishing (CMP) process to remove selected amounts of said photoresist and Cu.

2. A method as in claim 1 wherein said single CMP is performed using a slurry comprising: $Si0_2$, Ammonium Persulfate, and Benzotriazole (BTA).

3. A method as in claim 1 further comprising depositing Al_2O_3.

4. A method as in claim 1 further comprising depositing a SiO_2 hard mask, and wherein said CMP process removes said hard mask material at substantially the same rate as said photoresist, and Cu.

5. A method as in claim 1 further comprising depositing a Ta barrier layer, and wherein said CMP process removes said Ta at substantially the same rate as said photoresist, and Cu.

6. A method for forming a Cu coil for use in a magnetic head, comprising:

Forming a magnetic pole structure;

depositing a photoresist;

depositing a hard mask;

patterning said hard mask to define a coil pattern;

performing a material removal process to form at least one trench according to said coil pattern;

depositing Ta

depositing Cu; and

performing a chemical mechanical polishing (CMP) process using a slurry comprising:

Amonium Persulfate, Benzotriazole (BTA), and SiO_2.

7. A method as in claim 6, wherein said depositing Cu includes sputter depositing a seed layer of Cu and then electroplating Cu.

8. A method as in claim 6 further comprising adjusting a ratio of Ammonium Persulfate and Benzotriazole (BTA) so that said CMP process removes material from said photoresist, hard mask, Ta, and Cu at substantially the same rate.

9. A method as in claim 6 further comprising forming a magnetic pedestal and a magnetic back gap extending from said pole structure and wherein a portion of

said photoresist is deposited between said magnetic pedestal and said magnetic back gap.

10. A method as in claim 10, wherein said magnetic pedestal and said back gap comprise NiFe.

11. A method as in claim 6, further comprising performing said CMP process sufficiently to form a substantially planar surface including said photoresist, and said Cu.

12. A method as in claim 6 further comprising performing said CMP process sufficiently to form a substantially planar surface including said photoresist, said Cu and said Ta.

13. A method as in claim 6, further comprising hard baking said photoresist before performing said material removal process.

14. A method as in claim 6 wherein said material removal process comprises reactive ion etching (RIE).

15. A method as in claim 6 further comprising depositing alumina (Al_2O_3).

16. A method as in claim 6

further comprising:

forming a magnetic pedestal and a magnetic back gap extending from said pole structure; and

depositing alumina (Al2O3) and wherein:

a portion of said photoresist is deposited between said magnetic pedestal and said magnetic back gap; and

said material removal process removes said material from said magnetic pedestal, magnetic back gap, photoresist, hard mask, Ta, alumina and Cu at substantially the same rate.

17. A slurry for use in chemical mechanical polishing, comprising:

SiO_2;

Amonium Persulfate ($(NH_4)_2S2O_8$); and

Benzotriazole BTA.

18. A method of forming a small Cu structure, comprising:

depositing a photoresist;

performing a material removal process form a cavity in said photoresist;

depositing Cu; and

performing a chemical mechanical polishing process using a slurry comprising:

$Si0_2$ Ammonium Persulfate, and Benzotriazole (BTA).